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ABSTRACT

The relationship between teacher training procedures that emphasize matching teacher behaviors with students' cognitive styles is investigated. Also explored is the association between the teacher's initial stage of role acquisition and the selection of decision-making patterns for planning and implementing matching models instruction. The study was conducted over an eight-month period in a junior high school. Throughout this investigation, a number of conclusions concerning the relationship between specific instruction events and subsequent student outcomes were observed. It was found that teachers assumed characteristics of roles that evoked positive responses from students. The data implied that matching models increases teacher flexibility and improves students' outcomes. Matching teacher and student role models is suggested as an effective decision-making strategy for instructional planning. (JD)

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THE USE OF MATCHING MODELS AS AN INSTRUCTIONAL
PLANNING AND STAFF DEVELOPMENT STRATEGY

by

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THE USE OF MATCHING MODELS AS AN INSTRUCTIONAL PLANNING AND STAFF DEVELOPMENT STRATEGY

Each year, research conducted in the field of education has added to the reservoir of information available for use in educational practice. This knowledge encompasses a wide range of topics such as individual differences, goal specifications, curriculum development, differential effects of various teaching methods, and the nature of interpersonal communication between teachers and students. The accessibility of such knowledge is considered by some authorities to be invaluable to educational practitioners. However, as technical information increases, the problem of making educational decisions for individual students becomes increasingly more difficult for teachers. Thelen (1970), over 15 years ago, recognized the limitations of such diverse and amorphous knowledge:

We know a great deal about the nature of man, knowledge, and society; about the dynamics of learning by individuals; about intergroup performance; about intergroup relationships and social action; about community improvement. But most of this knowledge has so far made almost no dent at all on educational practices, and with the present tendency to think that educational problems can be solved with money and organizational changes, the likelihood of any significant improvement is discouragingly slight. (p. 1)

With the plethora of information flooding the educational marketplace, teachers and other professionals are limited in the ways they can first, process and judge the merit of selected information, and second, actually apply that information in the classroom. Given the volume of new information and the amount of time that it takes to assess it, teachers face more complex decisions regarding the instructional experiences that they create for individual students. Yet, as Nachtigal (1967) noted, it is ironic that as the body

of knowledge increases so does the tendency for teachers to use fairly constant and relatively small amounts of this information.

Teaching involves many variables: the teacher, the learner, the subject matter, the goals and objectives, the methods used to attain these goals and objectives, and the learning environment. The development of a framework or model for conceptualizing the teaching-learning process, with its complex set of interrelationships among variables, would be a step toward the effective use of educational information. Such a model, based on interaction concepts, is also appropriate because the teaching-learning process can be conceptualized as a system of interactions between individual students and educational environments. To view the teaching-learning process in terms of its variables (or what Nachtigal refers to as the "building block approach") will also allow the flexibility needed to create environments which "match" the individual needs of students.

Lewin's (1935) classic formula, "Behavior is a function of the Person (P) and the Environment (E), or $[B = f(P, E)]$, provides another structure for conceptualization of the teaching-learning process" (p. 73). Translated, the formula becomes B-P-E; learning outcomes (B) are the result of the interactive effects of different kinds of students or student characteristics (P) with different kinds of teaching methods (E). The B-P-E paradigm itself is considered to be metatheoretical in nature as opposed to theoretical.

The B-P-E paradigm can also provide the structural organization needed to analyze the decision-making procedures used by teachers in the teaching-learning process. Hunt and Sullivan (Hunt, 1975) elaborated on the B-P-E paradigm and applied it to decision-making processes. They suggested that "making decisions at each step of the [teaching-learning] process requires

coordination, and, therefore, a model is needed which will guide the decision-making" (p. 19). In this context, they specified five criteria as a basis for a decision-making plan in teaching called "matching models." The model conforms to the following criteria:

- (1) provides a basis for specifying objectives,
- (2) describes the information to look for,
- (3) describes explicitly the dimension or categories on which students are classified,
- (4) states the matching principle which coordinates student characteristics and the educational approach, and
- (5) describes specific examples of generally prescribed educational approaches. (Hunt, 1975, pp. 19-20)

In addition to decision-making, another critical variable in the teaching-learning process concerns the role of the teacher. For many years, social psychologists conducted studies regarding the role of the teacher and explored the phenomenon of how role positions affect behavior. More recently, those who have studied the interaction between teaching and learning have also focused attention on the influence of expectations on role behavior. Thornton and Nardi (1976) discuss the process of role acquisition as a developmental phenomenon which entails progression through four stages: (a) anticipatory, (b) formal, (c) informal, and (d) personal. Different expectations predominate at each stage and individuals assume their roles based on these expectations.

The specific focus of this study was concerned with two aspects of the teaching-learning process: (a) instructional decision-making, and (b) the role of the teacher. Of major importance was the specification of matching models as a planning strategy for teachers to use in instructional decision-making.

Methods

General Methods

The study included two general methods of research. The first method is a form of participant observation in which the researcher interacted with the group being studied during the planning and staff development training sessions of the seventh-grade reading team. The second method, which is statistical in nature, is the evaluation through regression analysis of selected measures of reading achievement collected from the target population. Student reading performance is then correlated with decisions that were made during the planning processes.

Description of the School District and Site of the Experiment

This study was conducted during an eight-month period in a school district located approximately 15 miles northeast of Pittsburgh. Wage earners residing in the district are mainly engaged in blue collar types of employment, primarily at several large corporations located within or adjacent to the district boundaries.

The school in which the treatment took place is a Teacher Center affiliated with the University of Pittsburgh, School of Education. It houses students from kindergarten through seventh grade and is one of three elementary schools in the district. The total student enrollment is 565. The study involved 76 students in four seventh-grade classes.

Description of the Staff

This particular Teacher Center contains a differentiated staffing model including student teachers, resident teachers, team leaders, an instructional leader, and university faculty members.

For the purposes of this study, the staff was categorized either as the members of the reading team or as the staff developers. The team leader, resident teacher, intern teachers, and student teachers comprised the reading team. The staff developers included the instructional leader, university faculty member, and the researcher. Guidelines concerning the responsibilities and role expectations governing the behavior of staff members was defined by the team members during the first phase of the study. The characteristics of the reading team members and staff developers, and the role expectations referred to previously, are summarized in Table 1.

Description of the Student Population

Seventy-six reading students in the seventh grade were selected as subjects for the treatment group. They received initial reading instruction via team-made units (TMU) which were based in part on objectives contained in the Reading System for Individually Paced Instruction (IPI).

Design of the Study

The design of the study included three phases: (a) orientation-Information, (b) Implementation of Matching Models, and (c) Analysis of Student Outcomes and Evaluation of the Training Model. First, each phase of the study will be described; then a summary of the procedures within each phase will be specified.

Phase I: Orientation-Information

Description

During the initial phase of the study, a description of the Conceptual Level Matching Model was presented to the reading team. Teachers were encouraged to explore both the theory and rationale behind matching models as an

Table 1
Characteristics and Role Expectations of Staff Members

	Staff Member	Sex	Teacher Training Experience (Education)	Years of Experience	Role Expectations
Reading Team	Team Leader	F	B.S. in Elementary Education 30 graduate credits Elementary Ed. Pennsylvania State University University of Pittsburgh	12	Guide team members in decision-making process Liason between reading team and staff developers Implement matching models instruction Training-student teachers
	Resident Teacher	F	B.S. in Elementary Education M.A.T. in Elementary Education Boston University University of Pittsburgh	5	Implement matching models instruction Training-student teachers
	Intern Teacher # 1	F	B.S. in Elementary Education University of Pittsburgh	2½	Implement matching models instruction Assess and classify students according to CL
	Intern Teacher # 2	M	B.A. in History & Political Science University of Wisconsin	0	Implement matching models instruction Assess and classify students according to CL
	Intern Teacher # 3	F	B.A. in Elementary Education University of Pittsburgh	1	Implement matching models instruction Assess and classify students according to CL
	Student Teacher	F	Enrolled in Elementary Education Program of University of Pittsburgh	0	Implement matching models instruction
Staff Developers	Instructional Leader	F	B.A. in Elementary Education M.A.T. in Elementary Education 30 post masters credits University of Pittsburgh	5	Provide feedback on student achievement to the team Observe matching models instruction Conduct staff training sessions based on decision making patterns Collect implementation data
	University Faculty	M	B.S. in Elementary Education M.A. in Elementary Education D.Ed. in Elementary Education California State West Virginia University University of Pittsburgh	19	Provide information on matching models as a decision-making strategy Observe matching models classroom processes Conduct staff training sessions based on decision-making patterns Collect implementation data
	Researcher	F	B.S. in Elementary Education M.A.T. in Elementary Education 90 post masters credits University of Pittsburgh	4	Provide information on theory and practice of matching models concept Observe matching models classroom processes Conduct staff training sessions based on decision-making strategies Collect implementation data

educational approach. Emphasis was placed on the use of this model as a strategy for making instructional decisions.

A six-step application model was introduced and used as the framework for planning matching models instruction. Information relating to each of these steps was presented to the team during staff development training sessions. With this information as input, the team members formulated three instructional decision-making patterns. A questionnaire was then administered to the team at the end of Phase I to appraise the effectiveness of the training model. (Note: Any or all instruments used in the study are available upon request.)

The flowchart in Figure 1 illustrates the sequence of events in the Orientation-Information phase.

Procedures

The staff members involved with the study followed the team concept of instructional decision-making.* During the spring term of the previous school year, members of the seventh-grade reading team explored the matching models approach to instruction. Of major concern were differences in student learning styles and the method by which teachers could make instructional decisions to promote both academic and developmental growth. Training sessions were conducted to provide the team with basic information on the use of matching models as an instructional approach. After discussions, members of the team decided to explore this strategy as a system for meeting the needs of individual students.

The study was an extension of these training sessions and can be described as decision-oriented research. The team's decision to implement matching

*Team concept of instructional decision-making: decision-making which involves the consensus of all members of the seventh-grade reading team.

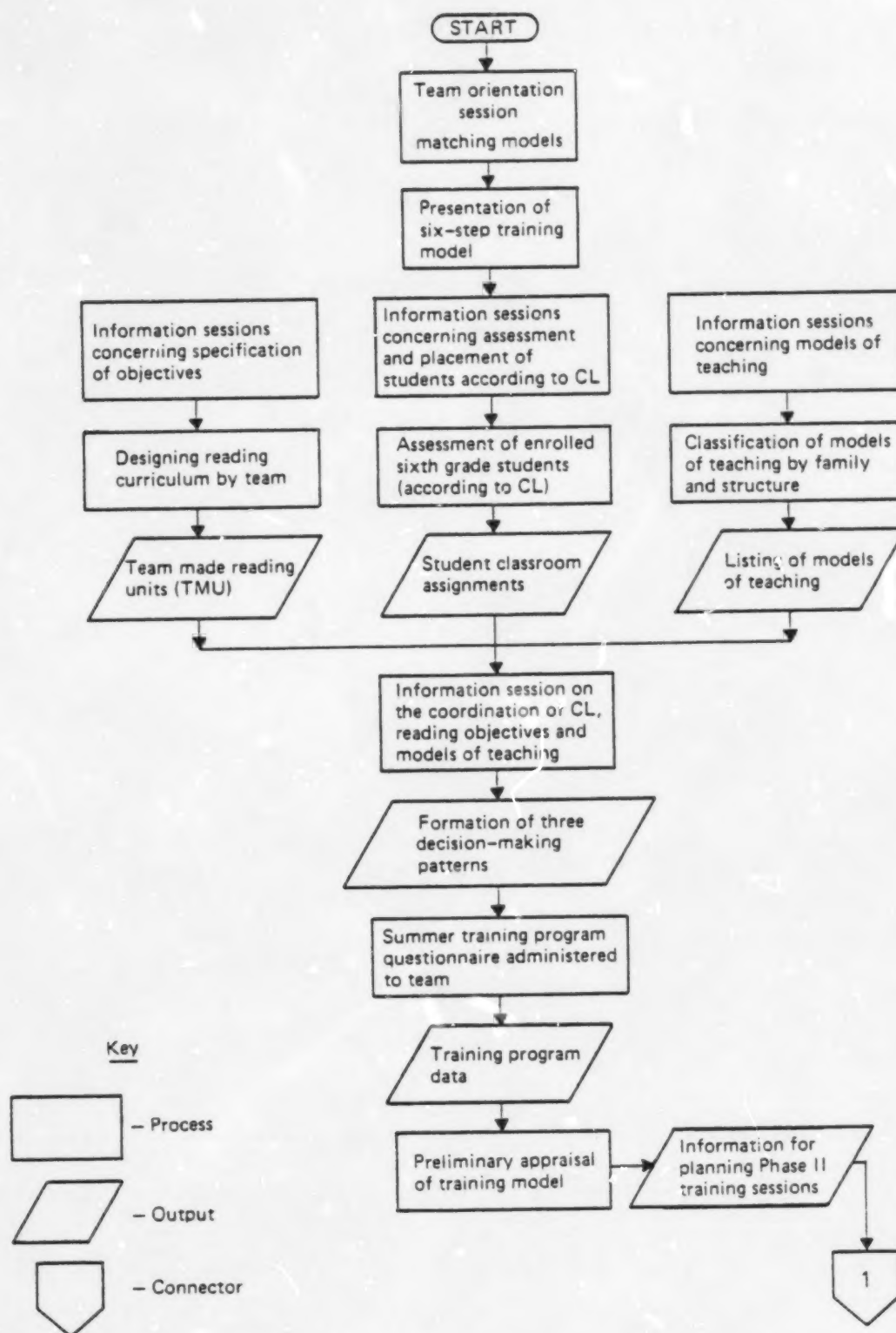


Figure 1. Phase I: Orientation-Information.

models instruction for seventh-grade students in the fall resulted in the selection of a specific application model. The model was presented to the team during staff training sessions. It is comprised of six steps:

1. Specifying Objectives
2. Obtaining Information Concerning the Conceptual Levels of Students
3. Classifying Students by CL
4. Translating Information into Teaching Approaches
5. Providing Appropriate Environments
6. Repeating the Cycle (Hunt, 1975, p. 21)

Three elements were extracted from the model and employed as the basis for constructing decision-making patterns: reading objectives, student conceptual level, and models of teaching. Information relating to each of these elements was presented during weekly staff meetings. The first element, reading objectives, was discussed in conjunction with several reading programs. The program designated for use by the district was the Reading System for Individually Paced Instruction (IPI).^{*} Reading instruction implemented in September was based in part on the objectives listed in Level IX of the IPI system. The team was responsible for designing reading objectives in the areas of study skills and reading survival skills.

Team-made units (TMU), the instructional materials used by teachers during the study, were formulated from both the IPI and seventh-grade reading curriculum objectives. Materials from a variety of sources, including basal and related programs, were available to the team for use in planning reading activities.

^{*}The IPI System originated in the Duval County Public Schools in Jacksonville, Florida. It is a comprehensive program consisting of 11 levels encompassing kindergarten through seventh-grade reading instruction. Students are tested on specific objectives in the areas of vocabulary, word analysis, comprehension, and oral reading. Areas of difficulty are diagnosed, and reading materials are chosen by teachers to strengthen these skills.

The second element, student conceptual level, can perhaps best be delineated as points on a continuum representing increasing levels of conceptual complexity and/or interpersonal maturity. Although advancement through the conceptual stages is continuous, the process can most aptly be described as a stage phenomenon. The diagram in Figure 2 shows each of the three primary stages in the developmental growth of conceptual level. Information concerning the progression from (a) an immature, unsocialized stage to (b) a dependent, conforming stage, and to (c) an independent, self-reliant stage (Hunt, 1975), along with the types of environments necessary to facilitate this progression, was presented to the team.

Additionally, information pertaining to the theory and practice of several models of teaching was presented in staff training sessions. During this period, a wide range of teaching methods was identified that could be used by teachers to create learning environments which meet the needs of the individual students. The models were grouped into four teaching "families" according to their orientations toward the learner and his environment. These models, classified by family and purpose, are listed in Table 2. After consideration of the theory and practice of several models were discussed in the sessions, decision-making patterns were designed. The patterns consisted of two binary operations involving the linkage of student conceptual level (CL), reading objectives (RO), and models of teaching (MT). The patterns defined were:

1. $(CL + RO) + MT$
2. $(CL + MT) + RO$
3. $(RO + MT) + CL$.

Sessions focused upon the use of these three patterns as strategies for

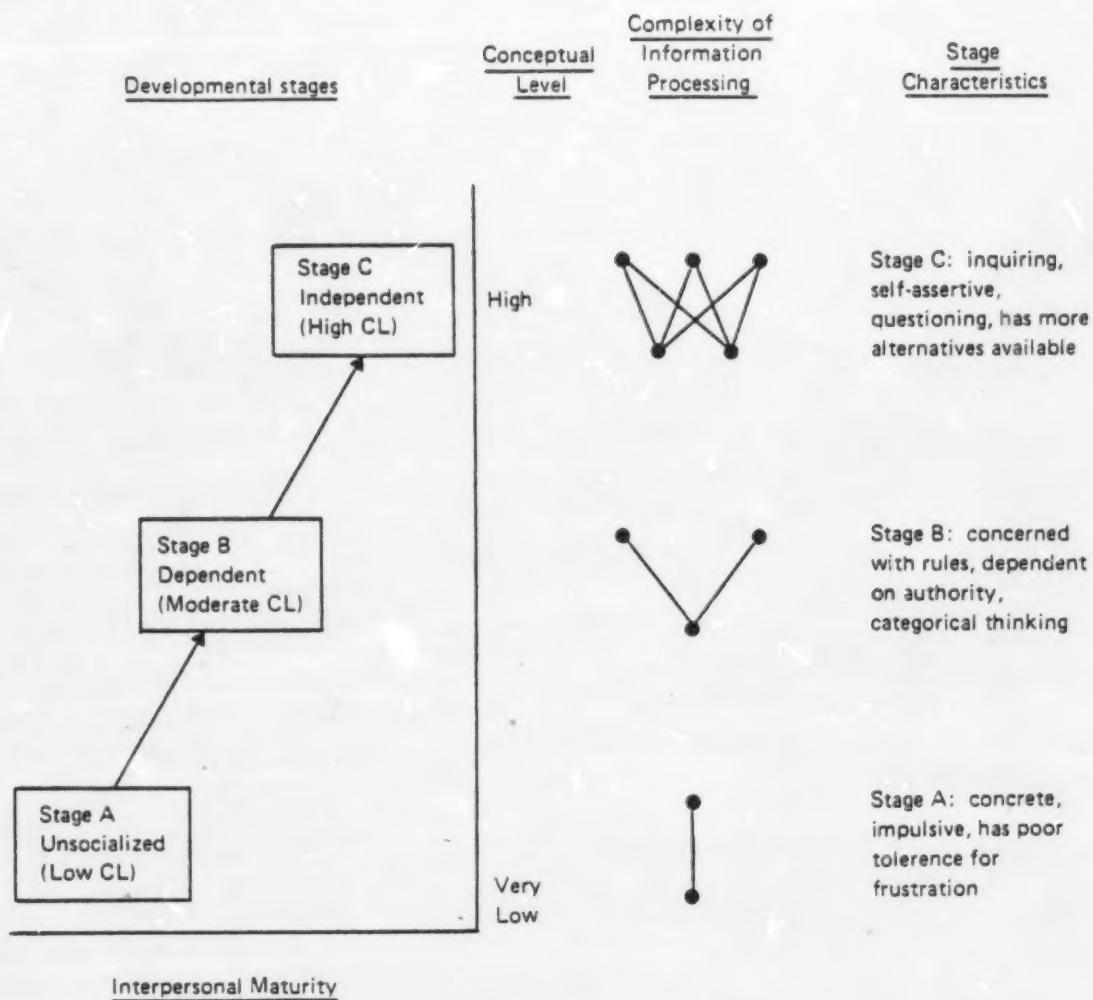


Figure 2. Development of conceptual level. (From Hunt & Sullivan, 1975, p. 21.)

Table 2
The Models of Teaching Classified by Family and Purpose

Model	Family or Orientation	Purposes or Goals
Inductive	Information processing	Primarily for development of inductive mental processes and academic reasoning or theory building.
Inquiry Training	Information processing	Development of inductive mental processes and academic reasoning or theory building.
Science Inquiry	Information processing	Designed to teach the research system of the discipline but also expected to have effects in other domains.
Jurisprudential Teaching	Information processing	Designed primarily to teach the jurisprudential frame of reference as a way of thinking about and resolving social issues.
Concept Attainment	Information processing	Designed primarily to develop inductive reasoning.
Developmental	Information processing	Designed to increase general intellectual development especially logical reasoning but can be applied to social and moral development (Kohlberg).
Advance Organizer	Information processing	Designed to increase the efficiency of information processing capabilities to meaningfully absorb and relate bodies of knowledge.
Group Investigation	Social interaction	Development of skills for participation in democratic social process through combined emphasis on interpersonal social skills and academic inquiry. Aspects of personal development are important outgrowths of the model.
Social Inquiry	Social interaction	Social problem solving primarily through academic inquiry and logical reasoning.
Laboratory Method	Social interaction	Development of interpersonal and group skills through this personal awareness and flexibility.
Non-Directive	Person	Emphasis on building capacity for self-instruction and through this personal development in terms of self-understanding, self-discovery, and self-concept.
Classroom Meeting	Person	Development of self-understanding and self-responsibility. This would have latent benefits to other kinds of functioning, i.e., social.
Awareness Training	Person	Increasing personal capacity for self-exploration and self-awareness. Much emphasis on development of interpersonal awareness and understanding.
Synectics	Person	Personal development of creativity and creative problem solving.
Conceptual Systems	Person and Social	Designed to increase personal complexity and flexibility.
Behavior modification	Operant Conditioning	General applicability. A domain-free approach though probably most applicable to information processing functioning.

Note. From Joyce, Weil, & Wald, 1973, p. 51.

meeting the needs of individual students.

As the team members became better acquainted with the elements of the decision-making patterns, they decided to classify students into instructional groups based on conceptual levels. This required the assessment of all enrolled sixth-grade students who would be grouped for seventh-grade reading instruction.

The Assessment of Conceptual Level: Paragraph Completion Method Test, or the PCT, was the instrument used by the team to assess the conceptual levels of the students. The rationale and procedure for administering the PCT was discussed during staff training sessions, and team members reviewed the criteria to be used as guidelines for placing the students into conceptual level groups.

Specifically, the PCT requires students to perform some conceptual work in answering the six questions listed in Figure 3. Students were asked to respond to each of these questions with three or four sentences, indicating their own personal reactions to each topic. Each of these responses was then coded by the team according to the guidelines reviewed. Students were then classified and placed into three conceptual level groups. Team judgment facilitated the process of placement in those cases in which PCT scores were too ambiguous for absolute placement. The final categorizations of students into instructional groups were reviewed during team discussions.

The final procedure in Phase I of the study was that team members completed a questionnaire designed to appraise the usefulness of information relating to each element of the training model. A preliminary appraisal of the training model itself was based on the responses obtained from this questionnaire.

Paragraph Completion Method Test (PCT) Items:

1. What I think about rules . . .
2. When I am criticized . . .
3. What I think about parents . . .
4. When someone disagrees with me . . .
5. When I am not sure . . .
6. When I am told what to do . . .

<u>PCT Item Score</u>	<u>Example of Scoring Referent</u>	<u>Stage</u>
3	Multiple alternatives	C
2	Beginning self-definition	
1	Categorical thinking	B
0	Self-protection	A

Figure 3. Conceptual level scoring and classification. (From Hunt, Greenwood, Brill, & Deineka, 1972, p. 14.)

Phase II: Implementation of Matching Models

Description

Phase II of the study involved the implementation of the Conceptual Level Matching Model for students in the treatment group. Based on the six-step application process, teachers at varying stages of role acquisition initially selected one of the three decision-making patterns as a basis for implementing matching models instruction. Each team member received training based on a decision-making pattern from the staff developers. Information concerning the types of patterns pursued by individual teachers was collected by staff developers.

The flowchart in Figure 4 illustrates the sequence of events which occurred in Phase II of the study.

Procedures

Throughout the implementation phase of the study, staff development training sessions continued on a weekly basis. Emphasis was focused on the process of decision-making and on processes by which teachers at varying stages of role acquisition selected and adjusted decision-making patterns to meet the needs of students.

A questionnaire designed to determine the initial stage of role acquisition was administered to each team member in September. Once a determination was made by the researcher concerning initial stage of role acquisition, the implementation process began with the identification of a decision-making pattern by teachers. The pattern selected (as a strategy for implementing reading instruction) was used to coordinate student conceptual level, reading objectives, and models of teaching. The methods used to obtain accurate descriptions of the matching models process included: (a) observation forms designed for team

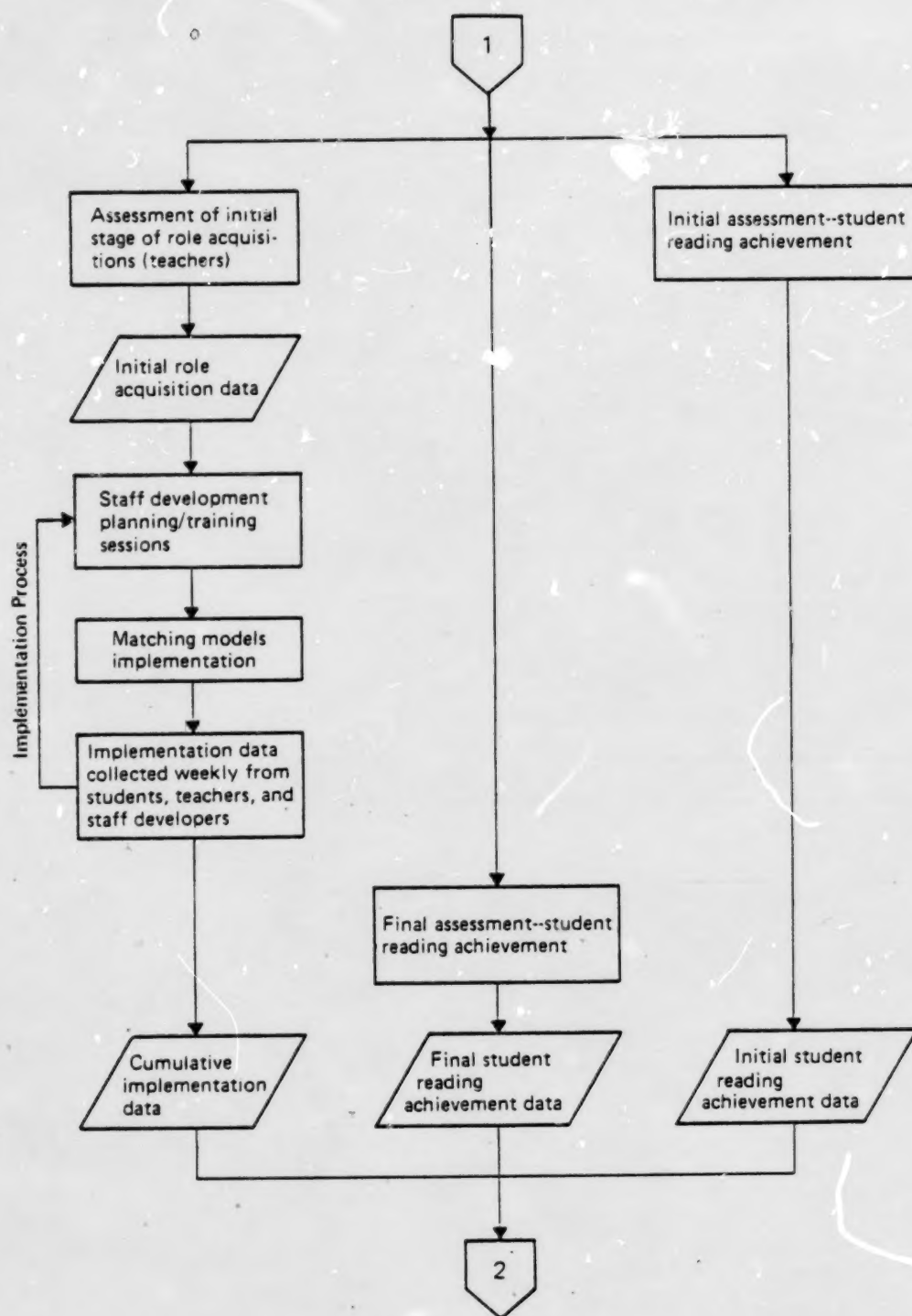


Figure 4. Phase II: Implementation of matching models.

members and staff developers to gather information on matching models processes, and (b) classroom environment survey designed to provide a detailed description of how various students in the educational environment viewed that environment over time (see Appendices A and B).

Weekly evaluation of data from observation forms and bi-weekly evaluation of data from Classroom Environment Surveys occurred. Staff developers met with team members and presented three types of data in the formative feedback process: (a) matching models planning data, (b) data from observation forms, and (c) classroom environment survey data. This information was then used to plan future instructional activities.

The following sequence of events occurred with each planning cycle over a four-month period: (a) staff development training sessions, (b) implementation of matching models instruction, and (c) collection of implementation (process) data from students, teachers, and staff developers. The flowchart in Figure 5 illustrates the implementation process as it occurred weekly.

Regarding testing for the students, the vocabulary, reading comprehension, and total language subtests of the Iowa Test of Basic Skills were administered at the beginning of Phase II. It has been district policy to administer the complete test battery to students during the spring term of each school year. The decision to use this particular test is in keeping with that policy. Should the team decide to continue the matching models approach to instruction, results obtained on the reading and language subtests will be useful in making future longitudinal comparisons of student gains in reading achievement.

More testing occurred in December when the students were again assessed using the same subtests.

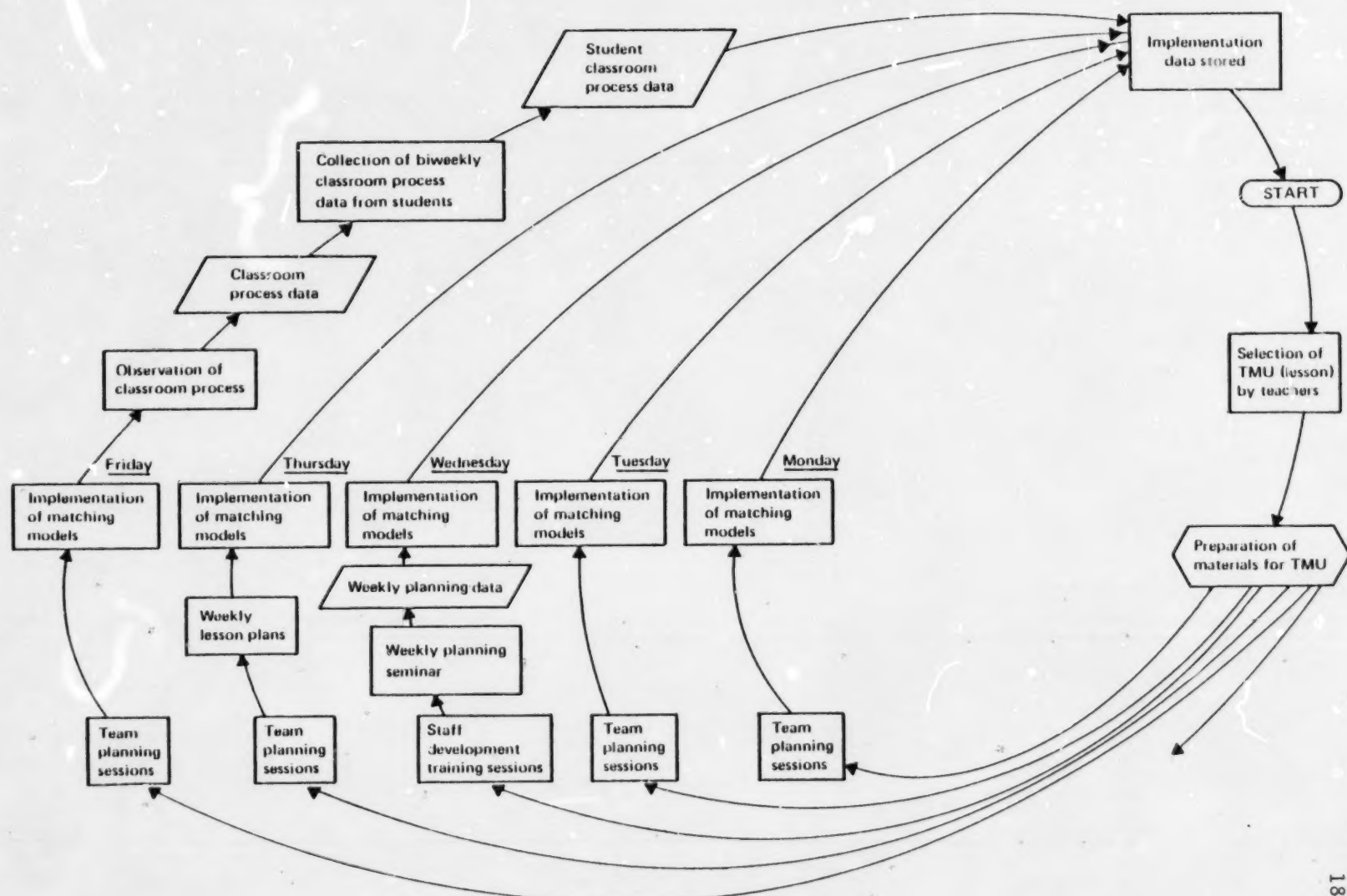


Figure 5. Weekly implementation activities of reading team.

Phase III: Analysis of Student Outcomes and Evaluation of the Training Model

Description

During the third and final phase, data obtained from measures of student outcomes were analyzed and reported to the team. Based on these results, the training model was evaluated, and the relationship between matching models as a decision-making strategy and selected student outcomes in reading was determined. Additional analyses concerning the selection of decision-making patterns by teachers were also compiled and evaluated. Staff developers collected and presented this data to the team concurrent with reporting the student outcomes.

The flowchart in Figure 6 illustrates the sequence of events which occurred during the third phase of the study.

Procedures

The final phase of the study entailed the summative analyses of two types of data: (a) student outcome data--vocabulary development, reading comprehension, and language skills, and (b) implementation process data collected by staff developers--matching models planning data, data from observation forms, and Classroom Environment Survey data.

The Analysis of Regression Test was used by this researcher to evaluate the student outcome data. A regression graph was plotted, and students whose residual scores deviated (± 2 SD) from the regression line were designated for further evaluation.

For these particular students, individual profiles using the raw scores from the reading achievement subtests were constructed to ascertain individual patterns of reading achievement in each of the three subtest areas. Additional

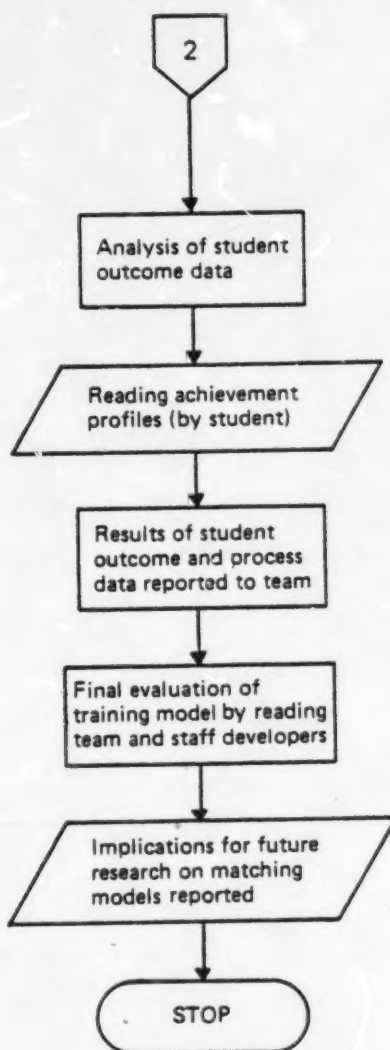


Figure 6. Phase III: Analysis of student outcomes--Evaluation of training model.

profiles were constructed which illustrated student perception of classroom environments, and during the final staff development training sessions, inferences were drawn concerning the influence of the decision-making strategies on selected student outcomes.

Results

Student Achievement in Reading

Several multiple regression analyses were used to investigate questions related to the student outcome data. Three variables were identified as predictors in this analysis: (a) student conceptual levels (CL), (b) Classroom Environment Survey (CES) scores, and (c) student pretest scores obtained from the vocabulary development, reading comprehension, and language skills subtests of the Iowa Test of Basic Skills (ITBS). The criterion measures were student posttest scores obtained from the ITBS subtest areas designated above.

In accordance with these predictor variables, the conceptual level of each student was identified during the spring term of the previous school year, and three CL Groups were formed upon the basis of these assessments. The conceptual level had been isolated as an important predictor variable since student conceptual levels varied and planning activities might be matched accordingly.

The second measure used as a predictor variable was the Classroom Environment Survey (for CES, see Appendix B). During Phase II of the study, this survey was administered to students in each CL group at periodic intervals. Teachers were both notified of the results of this survey and appraised of the information obtained during the observations. Therefore, it is possible

that feedback data contributed to planning activities which effected changes in the classroom environment. Thus, CES scores obtained from the final (fourth) assessment were among the measures used to predict student performance in reading.

In addition to student CL and CES results, the third variable used to predict student reading achievement was pretest performance as measured by the reading-related subtests of the Iowa Test of Basic Skills. As indicated in the literature, measures obtained from pretest data highly correlate with and are dependable predictors of the measures subsequently obtained through posttest data. In an examination of Project TALENT, one of the major programs of research on predictive validities of educational measurements, Cooley and Lohnes (1976) suggested that a preponderance of the variances in student outcomes can be attributed to the initial abilities and the motivations of the learners. Therefore, the assessment of initial input (pretest scores) was designated as one factor in predicting and explaining the variations in student outcomes.

These pretest scores and the Classroom Environment Survey (CES) scores are the continuous predictor variables depicted with the criterion variable--the posttest scores--in Table 3. The means and standard deviations of 76 students to whom both the pretests and posttests were administered are incorporated in this table. It should be noted that conceptual level, although a predictor variable, was excluded from this table since it was noncontinuous in nature.

As indicated on Table 3, the reading subtests of the Iowa Test of Basic Skills were difficult for the students of this study. Although a slight increase in mean scores was attained in the interval between pre-and post-

Table 3
Means and Standard Deviations of Continuous
Predictor and Criterion Variables

Continuous Predictor and Criterion Variables	Maximum Possible Score	Seventh Grade Reading Students Raw Score Data (N = 76)	
		Mean	SD
Classroom Environment			
Survey	36	25.3	4.9
Pretest Scores:			
Vocabulary Development	48	23.1	7.6
Reading Comprehension	126	35.5	14.1
Language Skills	214	70.5	29.3
Posttest Scores:			
Vocabulary Development	48	24.6	8.5
Reading Comprehension	126	41.4	14.9
Language Skills	214	75.6	30.4

testing, a comparison of mean scores with maximum possible scores for each subtest indicates that for this group the test represented a formidable task.

Intercorrelation data on the predictor and criterion variables are presented in Table 4. An examination of this table indicates that high correlations exist between pretest measures and corresponding posttest measures in each of the reading subtest areas. In addition, high correlations are evinced between vocabulary development (V_1 and V_2) and reading comprehension (R_1 and R_2) and language skills (L_1 and L_2).

These findings support the contentions of many researchers that initial abilities of students may be related to educational outcomes. The high correlation between pretest and posttest measures emphasize the Cooley and Lohnes (1976) supposition that individual differences in initial abilities presage differences in learning outcomes. In discussing the summary and interpretation of data, Gnanadesikan (1977) stated:

With large bodies of data, although models are appearing that may lead to simple interpretations of the data, it is very important to give means of gauging the appropriateness and sensitivities of the models under consideration. The useful role of residuals in exposing any inadequacies of a fitted model in the analysis of uniresponse problems has come to be widely recognized.... One use of residuals is to detect so-called outliers or extremely deviant observations, which are not uncommon in large data sets. ...Pinpointing outliers for further investigation and pursuit can be a valuable outcome of the statistical analysis of the data. (p. 258)

Therefore, in order to identify outliers (those students whose posttest scores differed by ± 2 or more standard deviations from the predicted scores) from among the 76 students tested in this study, multiple regression analyses were conducted for each of the three reading subtests administered. In each case, a combination of three variables was used to predict the outcomes of

Table 4
Intercorrelations of Predictor and Criterion Variables

Variable	CES	Conceptual Level	Vocabulary Development		Reading Comprehension		Language Skills	
			Pretest (V ₁)	Posttest (V ₂)	Pretest (R ₁)	Posttest (R ₂)	Pretest (L ₁)	Posttest (L ₂)
CES	1.00	.38	.40	.40	.40	.39	.38	.42
Conceptual Level		1.00	.35	.29	.36	.30	.50	.41
Vocabulary Development:								
Pretest (V ₁)			1.00	.87	.83	.83	.75	.73
Posttest (V ₂)				1.00	.78	.85	.74	.81
Reading Comprehension:								
Pretest (R ₁)					1.00	.82	.81	.76
Posttest (R ₂)						1.00	.77	.86
Language Skills:								
Pretest (L ₁)							1.00	.89
Posttest (L ₂)								1.00

the criterion variables, i.e., posttest scores in each subtest area. The predictor variables were: (a) conceptual level, (b) Classroom Environment Survey scores, and (c) corresponding pretest scores obtained in each subtest area. Table 5 depicts multiple correlation data for vocabulary development, reading comprehension, and language skills.

A comparison of those data to the correlation coefficients presented in Table 4 indicates that the Multiple R closely approximates the correlation coefficients obtained on posttest measures for each subtest. This further supports the utilization of pretest measures as indicators for posttest measures.

For each multiple regression analysis, a prediction equation was formulated to calculate posttest scores. Residual values were computed for all 76 students participating in the study. Those whose residual values incorporated ± 2 standard deviations from the regression line were identified for further analysis. Table 6 includes the identification of these nine students who were outliers in the reading subtest areas.

The investigation of the outliers involved the utilization of the posttest data in conjunction with the CES assessments, which facilitated the development of inferences discussed in detail in individual student case studies. The one problem illustrated by this study was with such a limited number of cases (outliers), this researcher cannot determine if or what kind of relationship exists between planning activities which emphasize matching models and subsequent student performance in reading. However, the review of inferences from individual case studies regarding this relationship facilitated the formulation of the following hypotheses:

Table 5
Multiple Correlations for Reading Subtests

	Multiple R	R ²
Vocabulary Development	.87	.76
Reading Comprehension	.83	.69
Language Skills	.90	.81

Table 6
Outliers Identified from Regression Analyses

Student/Case Number	Reading Subtest		
	Vocabulary Development	Reading Comprehension	Language Skills
8 / I	N	N	
37 / II	N		
42 / III	P		
71 / IV	N		
38 / V		P	P
75 / VI		N	
15 / VII			P
47 / VIII			N
62 / IX			N

P represents Positive Residual Value i.e., actual posttest score was greater than predicted score by 2 SD.
N represents Negative Residual Value i.e., actual posttest score was less than predicted score by 2 SD.

1. When the variables which constitute classroom structure are manipulated, the effect of these changes on student performance in reading as measured by the Iowa Test of Basic Skills will vary according to the conceptual levels of the students.

2. When variables which constitute classroom structure are manipulated during the course of an instructional sequence, student performance in reading as measured by the Iowa Test of Basic Skills appears to decline.

3. Students appear to perceive environments which are consistent in structure more positively than those environments which are modified during the course of an instructional sequence.

Teacher Role Acquisition

In addition to exploring the relationship between matching models as a decision-making strategy and subsequent student outcomes, this study also focused on the role of the teacher. Thornton and Nardi identified the four stages of role acquisition as: (a) anticipatory, (b) formal, (c) informal, and (d) personal. The initial stage of role acquisition for each team member was evaluated on the basis of an Initial Stage of Role Acquisition Assessment Questionnaire and an interview with the school principal. The results of this questionnaire indicated that one team member demonstrated the characteristics of the Anticipatory Stage, three team members demonstrated the characteristics of the Formal Stage, one team member demonstrated the characteristics of the Informal Stage, and one team member demonstrated the characteristics of the Personal Stage. In this study, the teachers were followed throughout the implementation process, with the preplanning section of the observation form providing information concerned with models of teaching utilized and reflecting changes in teaching approaches. Observations were also conducted, and

written commentaries from these observation sessions chronicled changes in teaching styles. On the basis of these two types of data, probabilistic inferences were drawn concerning their stages of role acquisition at the conclusion of the study. Four of the teachers appeared to have progressed to the next stage of role acquisition respective to their respective initial evaluations, and the other two teachers seemed to have developed flexibility and the ability to "read" their students sufficiently to indicate that they were in the process of advancing to the next stage respective to their initial positions. At the conclusion of the study, no team members demonstrated the characteristics of the Anticipatory Stage, two teachers demonstrated the characteristics of the Formal Stage, three teachers demonstrated the characteristics of the Informal Stage, and one teacher demonstrated the characteristics of the Personal Stage. Interviews conducted with each of the team members provided testimonial data which indicated that all of the teachers had benefited from the knowledge of matching models which they acquired during the planning program and the experience in implementing matching models. All of the teachers acknowledged that they had developed competencies to elicit information from their students ("read") and to adjust their teaching styles accordingly ("flex").

Conclusions

In accordance with the purposes of the study to examine the relationship between planning activities based upon matching models as a decision-making strategy and student outcomes in reading and to explore the role of the teacher, the following conclusions are proposed:

1. Based upon the student outcome data compiled during this study, the relationship between planning activities based upon matching models as a

decision-making strategy and student outcomes in reading could not be determined.

2. Teachers at varying stages of initial role acquisition do utilize decision-making patterns which coordinate conceptual level with reading objectives and models of teaching for planning activities for the implementation of matching models instruction.

3. A training program specifically designed to familiarize teachers with the matching models concept promoted a developmental movement in role acquisition.

Implications

Instructional decision-making is integral to the implementation of classroom activities. The preparation of teachers through teacher training programs should, therefore, focus upon the decision-making process in order to develop the competencies of teachers in planning instruction. The use of matching models as a decision-making strategy merits further investigation because it attempts to match each student with an appropriate educational environment. When the effectiveness of planning decisions on student outcomes is measured by standardized achievement tests, it is highly unlikely that the significance of planning processes will be shown. Rather, these outcome measures should focus on the specific objectives. Thus, criterion-referenced testing is a more viable method for gauging effectiveness.

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APPENDIX A

Implementation Data: Matching ModelsI. Planning Data

Unit Title _____

Team Member _____

Staff Developer _____

Today's Date _____ Time _____

1. List the general objectives of this unit.
2. List the specific objectives of this lesson.
3. What type of activities/materials (i.e., IPI, Projections) have been designated for the attainment of these objectives?
4. How will student ability to master objectives be evaluated?
5. What CL group is represented in the classroom?
Low CL (1) _____ Moderate CL (2) _____ High CL (3 & 4) _____
6. What model(s) of teaching has been chosen for this lesson?

7. What specific decision-making pattern will be employed as the basis for reading instruction?

_____ (CL + RO) + MT = Planning decision

_____ (CL + MT) + RO = Planning decision

_____ (MT + RO) + CL = Planning decision

8. Planning decisions:

- a. What types of decisions were reached during planning activities?

Planning decisions	Conflicts/Consensus

- b. Some planning decisions will evolve as a result of team consensus; others will be a source of team/personal conflict. Go over the list you have just composed and describe the type of process (conflict/consensus) which generated each planning decision.

II. Observation Data

Unit Title _____ Date _____

Teacher _____ Observer _____

1. How many students were in the classroom during the observation?

2. List the team members (and their roles) who were involved in student instruction.

3. How much time was scheduled for reading instruction?

4. In your judgment, for what percentage of the scheduled reading time were the students actively engaged in reading?

5. Describe the classroom environment according to the amount of structure.

☐ Low structure
☐ Moderate structure
☐ High structure

6. Was the model of teaching designated for this lesson employed by the teacher? (Insert list of competency checklist for designated model.)

7. Was the teacher able to adapt or "flex" the model according to student responses ("reading" student information)?

8. Check the "flexing" pattern exhibited (most often) by the teacher in response to information obtained from "reading" student behavior.
 - ☐ Completely insensitive
 - ☐ Aware of response(s), but does not modulate
 - ☐ Aware of response(s), and makes some attempt to modulate
 - ☐ Shifts and modulates presentation in flexible pattern
 - ☐ Modulates and explores for more information from learner's frame of reference¹

9. Were all of the objectives preplanned for the lesson covered? ____
If no, which were not?

10. What form of evaluation was employed to assess the (achievement of) objectives of the lesson?

11. If evaluative measures indicated nonmastery of a skill or concept, what alternative(s) did the teacher employ?

12. List the activities that students participated in during the lesson.
Do these match the preplanned lesson activities?

¹ Referents taken from an Adaptability Index developed by Hunt to assess the adaptability in interpersonal communication of training agents.

APPENDIX B

Classroom Environment Survey

INSTRUCTIONS

There are 36 statements in this survey. They are statements about junior high school classrooms. You are to decide which of these statements are true of your classroom and which are false.

Make all your marks on the separate answer sheet. If you think a statement is true or mostly true of your class, make an X on the line beside true. If you think the statement is false, or mostly false, make an X on the line beside false.

1. Students put a lot of energy into what they do here.
2. Students in this class get to know each other really well.
3. The teacher takes a personal interest in this class.
4. Almost all class time is spent on the lesson for the day.
5. Students do not feel pressured to compete here.
6. Students fool around a lot in this class.
7. There is a clear set of rules for students to follow.
8. Students can get in trouble with the teacher for talking when they are not supposed to.
9. What students do in class is very different on different days.
10. Most students in this class really pay attention to what the teacher is saying.
11. It is easy to get a group together for a project.
12. The teacher goes out of his/her way to help students.
13. Students are expected to stick to classwork in this class.
14. Students try hard to get the best grade.

15. The teacher often has to tell students to calm down.
16. The teacher explains what will happen if a student breaks a rule.
17. Students do not always have to stick to the rules in this class.
18. The teacher likes students to try unusual projects.
19. Very few students take part in class discussions or activities.
20. Students enjoy working together on projects in this class.
21. If students want to talk about something, this teacher will find time to do it.
22. Getting a certain amount of classwork done is very important in this class.
23. Students here do not care about what grade the other students are getting.
24. Assignments are usually clear so everyone knows what to do.
25. In the first few weeks, the teacher explained the rules about what students could and could not do in this class.
26. Students are expected to follow set rules in doing their work.
27. Students sometimes do extra work on their own in this class.
28. Students really enjoy this class.
29. Students do not have much of a chance to get to know each other in this class.
30. This teacher wants to know what students themselves want to learn about.
31. We usually do as much as we set out to do.
32. Students have to work for a good grade in this class.
33. Activities in this class are clearly and carefully planned.
34. The teacher is consistent in dealing with students who break the rules.

Appendix B (Cont'd)

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35. When the teacher makes a rule, he/she means it.
36. Students do the same kind of homework almost every day.